

observations, pointing out that some, but not all, are to be looked upon as the traces of rudimentary hairs. For instance, Dr. A. Fjelstrup, of Copenhagen (Zool. Anz. xi. p. 14, 1888), writes as follows:—"Bei den meisten in Midvag getöleten *Globocephalen* zeigte die Haut, zumal in der Unter- und Oberkieferregion, eine Menge kreisförmiger Porenfiguren, in Grösse und Anordnung individuell sehr verschieden. Die Kreise haben meistens einen Diameter von $\cdot 5$ -1 cm., einzelne bis über 1.5 cm. Die Anzahl der Poren in jedem Kreise variiert der Grösse gemäss von etwa 20-50; ihr Diameter ist durchschnittlich $\cdot 16$ mm. Es finden sich sowohl unvollständige, sich schneidende oder beinahe concentrische Kreise als vereinzelte Poren." The general description of these structures, their size, the manner in which the circles intersect or overlap, their irregular arrangement, in various parts and on some individuals only, and the further statement that no sign of them is visible in the foetus, all incline me to think that here also we have to do with scars left by a cuttlefish. Similar structures have evidently been observed in *Globocephalus* by Bennett, quoted by Eschricht and again by Fjelstrup:—"On the head, and chiefly around the lips, the skin is marked with many scattered circles, each the size of a sixpence, and composed of a single row of small depressed dots, which would appear to mark a disposition to the formation of vibrissæ or whiskers." I need hardly repeat that I do not agree with this interpretation of their cause.

LXV.—*A List of Californian Diatoms.*

By C. MERESCHKOWSKY.

[Concluded from p. 480.]

133. *Campylodiscus Thuretii*, Bréb. San Pedro, Monterey, not rare. [M.]
134. *Striatella unipunctata*, Agardh. San Pedro, Monterey, not rare. [M.]
135. *Rhabdonema lineare*, Mer. Common in Northern California; Monterey, rare; San Pedro, very rare. [M.]
- This species has been described and figured in my paper "On Polynesian Diatoms" (see chapter iv.).
136. *Rhabdonema*, sp.? (Pl. V. figs. 21, 22.) Northern California, rather rare. [M.]

Valve linear-rhombic or rhombic, strongly gibbous in the
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middle, with rounded ends; length 0.04–0.140 mm., breadth 0.022–0.028 mm. Structure composed of costæ, which, however, are very indistinct, almost invisible with an ordinary magnifying-power, the intercostal alveoli forming parallel striæ becoming radiate near the ends, which are smooth. Pseudoraphe very narrow, sometimes indistinct. Number of striæ 5.5–6.5 in 0.01 mm. Number of puncta 8 in 0.01 mm. Girdle-face as in *R. arcuatum*, but with finer transverse costæ, usually 8 (from 6 to 10) in 0.01 mm.

Fig. 21 shows a valve as it appears under an ordinary magnifying-power, the costa not being seen and the rows of puncta resembling those of *Achnanthisidium brevipes*; fig. 22 is a part of the valve under a greater magnifying-power.

This species, which has probably already been described*, but which for lack of necessary books I am unable to determine, is very frequent in the Aleutian Islands, and I possess it also in a slide labelled "California," without further indication of locality. Other species which this slide contains indicate that it comes from Northern California.

137. *Entopyla incurvata* (Arn.), Grun. Not rare in Southern California (Catalina; Clemente Islands and the coast, *Haliotus* washings); Californian guano. [M.]

Length 0.121–0.217 mm.; girdle-face of a large specimen 0.01 mm.; distance between two costæ 0.007 mm.

138. *Gephyria media*, Arn. Redondo Beach, not rare; Monterey, rare. [M.]

Length 0.196 mm., breadth of the girdle-face attaining 0.057 mm.; striæ 5 in 0.01 mm. Endochrome granular, composed of 30–40 large granules.

139. *Grammatophora angulosa*, Ehr. San Pedro, very rare. [M.]

140. *Grammatophora angulosa*, var. *hamulifera*, Kütz. San Pedro, Monterey, very rare. [M.]

141. *Grammatophora arctica*, Cl. Not rare in Monterey and in Northern California, rare in Southern (*Haliotus* washings). [M.]

Valve linear, very slightly attenuated towards the apices, breadth 0.007 mm.; striæ distinct, 12 in 0.01 mm., composed of distinct puncta; length of the frustule 0.028–0.054 mm., breadth 0.013–0.021 mm.; septa forming two or

* If not, its proper name would be *R. gibbosum*.

three undulations, upper end bent in a hook as in *Gr. angulosa*.

142. *Grammatophora costata*, Mer., sp. n. (Pl. V. figs. 15, 16.) Monterey, very rare. [M.]

Valve somewhat broad, perfectly linear, with broadly rounded apices; structure composed of costæ 8.5 to 9 in 0.01 mm.; intercostal spaces with a double row of small but distinct puncta forming decussating rows, pseudoraphe rather indistinct. Length 0.0417–0.0565 mm., breadth of the valve 0.0115–0.0133 mm.; diameter of the openings 0.0076–0.013 mm.

I have seen only three valves of this species, which has the same structure of the valves as in *Achnanthes longipes* or *Diploneis Smithii*. The septa, as can easily be seen from fig. 16, form more than one undulation (probably two or three); the openings of the septa are quadrangular, in small specimens they are rounded.

143. *Grammatophora decussata*, Mer. Monterey, very rare. [M.]

For the description of this species see my paper "On Polynesian Diatoms."

144. *Grammatophora marina*, var. *communis*, Grun. San Pedro, Redondo, common; Monterey, not rare. [M.]

145. *Grammatophora marina*, var. *hawaiensis*, Mer. Monterey, rare. [M.]

Length 0.065 mm., breadth of the girdle-face 0.024 mm., diameter of openings 0.0065 mm. Described and figured in "Polynesian Diatoms."

146. *Grammatophora marina*, var. *macilentata*, W. Sm. San Pedro. [M.]

147. *Grammatophora maxima*, Grun. San Pedro, very rare. [M.]

This might be the *G. robusta*, Dippel. I do not understand the difference existing between the latter and *G. maxima*.

There are a number of other species and varieties of *Grammatophora* to be found in California, which, however, require further examination and a careful comparison with similar forms from other localities.

148. *Plagiogramma californicum*, Grev. San Pedro, very rare; Calif. guano. [Gv., M.]

Occurs in Californian guano. *Plagiogramma inaequale*, Greville, seems to me to be the same as this species.

149. *Plagiogramma pulchellum*, Grev. Californian guano. [Gv.]
 150. *Plagiogramma pulchellum*, var. *ornata*, Grev. Californian guano. [Gv.]
 151. *Plagiogramma validum*, Grev. Californian guano. [Gv.]
 152. *Climacosphenia pacifica*, Mer. San Pedro, very common. [M.]

This species has been described and figured in my paper "On Polynesian Diatoms." The stypes are broad, elongated, and always contain in great number a small parasitic *Navicula*, so that at first glance the frustules of *Climacosphenia* appear to be sessile and fixed on some *Schyzonema*.

153. *Licmophora californica*, Grun. San Pedro, very common; Catalina Island, common; Redondo Beach, common; Monterey, rare. [G., M.]

Endochrome composed of numerous rounded granules. Stypes short, structureless, with dichotomic ramification, colonies small.

154. *Licmophora capensis*, Grun. Rather rare. [G., M.]

A sessile form.

155. *Licmophora debilis* (Kütz.), Grun. San Pedro, common; Catalina Island, very common on *Macrocystis*. [M.]

156. *Licmophora dubia*, Grun. San Pedro, very common; Catalina Island, rare; Monterey, rare. [M.]

Grunow considers this *Licmophora* as being a variety of *L. Jürgensii*, from which it differs by the strictly superficial septa, with septal puncta disposed on the extreme upper margin of the frustule. This characteristic, as well as a few others, being very constant in *L. dubia*, I prefer to regard it as a separate species, the more so as *L. Jürgensii* does not occur in the Pacific Ocean, while *L. dubia* is very common. This species seems to be a widely distributed one, reaching even the Indian Ocean (Sumatra).

In California the frustules are always sessile, while in the Black Sea they are fixed on somewhat elongated structureless stypes.

157. *Licmophora dubia*, var. *latior*, Mer. (Pl. V. figs. 10, 11.) Catalina Island, on *Macrocystis*, common. [M.]

Valve rather broad, cuneate, or elongated-ovoid, slightly and gradually attenuated from the summit to the inferior

apex, which is broad and rounded* ; margins straight, superior apex broadly rounded. Pseudoraphe indefinite; striæ very fine, not less than 24–25 in 0.01 mm. Girdle-face narrow, cuneate, with rather delicate margins, upper angles rounded. Septa superficial, very thin, straight, septal puncta small, strongly marginal. Endochrome granular. Length 0.031–0.041 mm., breadth of the girdle-face 0.0077–0.0125 mm., breadth of the valve 0.010–0.011 mm.

This variety differs from the type species, into which it gradually passes, by its broader valves and the more delicate appearance of the frustule. The breadth of the valves of *L. dubia* is about 0.009 mm., sometimes only 0.006 mm. (and even 0.0053 mm.), while here they are never below 0.01 mm., and their form is somewhat different, being more ovoid.

158. *Licmophora flabellata* (Carm.), Agardh. Common. [M.]

159. *Licmophora flabellata*, var. *parva*, Mer. (Pl. V. figs. 12–14.) San Pedro, not rare; Monterey, very common. [M.]

I have quite a number of slides containing *L. flabellata* from the Black Sea, the Adriatic, the Mediterranean, the Californian coast, &c., in which this species, although greatly varying in size, is never represented by specimens below 0.117 mm., varying from 0.117 to 0.437 mm. In one gathering from Monterey, however, I found in great number a small form varying from 0.064 to 0.146 mm., usually being about 0.075–0.1 mm., in which larger individuals are very scarce, and this same form frequently occurs also in several gatherings from San Pedro and in one from Sumatra. These facts prove undoubtedly that such forms cannot be considered merely as small-sized individuals of *L. flabellata*, but rather represent a separate variety, peculiar as it seems to the Pacific and Indian Oceans.

The form of the valve, in the smaller specimens at least, is also somewhat different and the girdle-face is broader and more cuneate. I give here a series of individual measurements:—

Length :	0.064	0.068	0.068	0.072	0.082	0.083	0.090
Breadth of the frust.:	0.020	0.025	0.031	×	0.019	0.024	0.027
		0.094	0.098	0.100	0.127	0.146	
		0.021	0.020	0.031	×	0.020	

Breadth of the valve 0.007–0.008 mm.

* Fig. 10 has been represented by the engraver as being slightly asymmetrical, which is not the case. The upper margin of fig. 11 ought to be straight.

160. *Licmophora lata*, Mer. (Pl. V. figs. 1-3.) San Pedro, Redondo Beach, very common; Monterey, common. [M.]

Valve broad, bottle-shaped, upper part somewhat linear or slightly attenuated to the summit, abruptly attenuated towards the lower third or fourth, becoming conical; lower apex somewhat narrow, rounded, upper broadly rounded. Pseudoraphe rather broad, very distinct, striæ very fine. Girdle-face moderately broad, cuneate, upper angles subrounded, upper margin convex; septa very deep, 0.012 mm. in average, arcuate; septal puncta distinct, round. Endochrome granular. Forming numerous colonies on long stypes composed of two layers, an external and a thinner but denser inner one; mode of ramification the same as in *L. dalmatica*, *L. gracilis*, and *L. paradoxa*. Length 0.055-0.077 mm., breadth of the girdle-face 0.028-0.041 mm., breadth of the valve 0.014-0.020 mm.

This species is nearly allied to *L. paradoxa*, from which it differs by the much broader valves of a somewhat different shape; the granules of the endochrome are rounded, while in *L. paradoxa* they are usually elongated, bacilliform, and the colonies are symmetrical, while in *L. paradoxa* one side of the colony is always more developed than the other.

161. *Licmophora Monksii*, Mer. (Pl. V. figs. 8, 9.) San Pedro, common; Redondo Beach, not rare. [M.]

Valve broad in the middle, slightly attenuated towards the superior apex, which is truncate, sometimes broadly rounded, more considerably attenuated towards the lower end, which is narrow; lower part forming an elongated cone with usually straight margins. Striæ fine, except at the lower end, where they are distinct under an ordinary magnifying-power, about 12-13 in 0.01 mm. Girdle-face (fig. 9) cup-shaped, with more or less convex margins, upper angles rounded. Septa very deep (average 0.007 mm.), very fine, almost straight and parallel, somewhat divergent above the septal puncta, the latter small, round, very distinct; secondary puncta large, adjoining the septa. Endochrome granular. Forming small colonies on short structureless stypes. Length 0.017-0.043 mm. (usually 0.025-0.035 mm.), breadth of the girdle-face 0.012-0.021 mm., breadth of the valve 0.007-0.008 mm.

The cup-shaped girdle-face of this species is a very peculiar character, not to be found in any other species. The secondary septal puncta (*a, a* in fig. 9), which usually are situated inwards of the septa, are here so close to the latter that, if not carefully examined, they can easily be mistaken for the septal

puncta themselves, the more so as they are larger than these latter. The deepness of the septa and their parallelism below the puncta, as well as the distinct striæ at the lower part of the frustule, contribute to make out of this species a very peculiar one. It has some relation only to *L. profundeseptata*, Mer., from the Mediterranean.

162. *Licmophora montereyana*, Mer. (Pl. V. fig. 6.) Monterey, very rare. [M.]

Valve narrow, linear in its upper half, abruptly attenuated in the middle, becoming again linear and very narrow in the lower quarter; superior apex broadly rounded, inferior inflated. Pseudoraphe invisible; striæ very fine, about 23 or more in 0.01 mm. Septa deep (0.0175 mm.). Length 0.119 mm., breadth of the valve 0.008 mm.

The valve of this species has a form similar to that of *L. remuloides*, Mer., from the Black Sea, but it is a very distinct species, the septa being deep and the lower apex inflated. It differs from *L. grandis* by the indefinite pseudoraphe, which is very distinct in the latter; the valve is also different. It has no close relation to any other species.

163. *Licmophora pacifica*, Mer. (Pl. V. figs. 4, 5.) San Pedro, not rare. [M.]

Valve broad, cuneate, ovoid in small individuals, sometimes slightly attenuated towards the summit, gradually tapering from the summit, which is broadly rounded, towards the narrow and subacute inferior apex; margins straight. Pseudoraphe and striæ distinct, the latter about 11–12 in 0.01 mm. Girdle-face broadly cuneate, with upper angles rounded, walls thick, inferior apex broad. Septa comparatively deep (average 0.0053 mm.), moderately arcuate; septal puncta round, very distinct. Endochrome granular. Sessiliform. Length 0.028–0.046 mm., breadth of the girdle-face 0.028–0.036 mm., breadth of the valve 0.0085–0.01 mm.

This species has a certain resemblance to *L. Lyngbyei*, to which it seems to be allied; it differs by the valves being sometimes ovoid, by the septa, which are not so deep, and the absence of stypes. The valves of larger specimens resemble somewhat those of *L. capensis*, Grun., but the septa are much deeper than in the latter.

164. *Licmophora paradoxa*, var. San Pedro, common. [M.]

This is not the type species, as represented by a form which is extremely abundant in Villefranche (Mediterranean);

the Californian form differs from the latter by its greater size, attaining 0.1 mm., usually 0.07–0.085 mm. (the type varies from 0.035–0.088 mm., average of thirty-three cases 0.054 mm.), and by the endochrome, which is always composed of numerous moderately elongate elliptic granules, while in the Mediterranean form they are usually very elongate, bacilliform, and not numerous. I give no name to this variety, as it requires further examination.

165. *Licmophora Thumii*, Mer. (Pl. V. fig. 7.) Monterey, common. [M.]

Valve of medium breadth, strongly clavate, slightly arcuate and asymmetrical, rarely symmetrical; upper part inflated, attenuated towards the superior apex, which is broad, truncate, abruptly attenuated at the superior quarter, becoming narrow and almost linear, inferior apex slightly inflated. Pseudoraphe broad, very distinct; striæ 16–17 in 0.01 mm., at the lower end as well as in the middle. Girdle-face cuneate, with rather thick outlines, upper angles subacute. Septa deep (average 0.016 mm.), slightly arcuate, thin below the septal puncta, thick above them. Length 0.098–0.188 mm., breadth of the valve 0.0115–0.0180 mm.

It is to Mr. Ed. Thum of Leipzig, the celebrated mounter of diatoms, who on many occasions assisted me in my studies, that I dedicate this species. It has no close relation to any other.

166. *Eunotogramma*, sp.? (Pl. V. figs. 24–27.) San Pedro, rare; Hawaii, rare. [M.]

I give the figures of a species of *Eunotogramma* which I have met many times, and which, for lack of necessary books, I am unable to determine. The striæ are sometimes fine, invisible with an ordinary magnifying-power (figs. 26, 27), sometimes distinct (figs. 24, 25), about 9 or 10 in 0.01 mm. Length 0.0175–0.023 mm., breadth of the girdle-face 0.011–0.013 mm., breadth of the valve about 0.007–0.008 mm.

167. *Raphoneis amphicerus*, var. *rhombica*, Grun. San Pedro, rare. [M.]

168. *Opephora pacifica* (Grun.), Petit. San Pedro, Monterey, common. [M.]

169. *Clavicula recens*, Mer. Northern California, very rare. [M.]

See my paper "On Polynesian Diatoms," chapter iv.

170. *Fragilaria (striatula, var. ?) californica*, Grun. [G.]

171. *Fragilaria coccochroma*, Mer. San Pedro, rare. [M.]
See my paper on the Diatoms of the Black Sea.

172. *Fragilaria hyalina* (Kütz.), Grun. San Pedro, rare.
[M.]

173. *Fragilaria spicula*, Mer., sp. n. (Pl. V. fig. 17.) Santa
Monica, rare. [M.]

Valve very narrow, lanceolate, with ends acute, length about 0.01 mm., striae invisible. Girdle-face very narrow, linear-lanceolate, with ends truncate. Forming small colonies in zigzag on very short narrow stipes, parasitic on *Nitzschia*. Endochrome composed of two narrow elongated plates asymmetrically disposed—one plate nearer to one end of the frustule, the second plate to the other end.

174. *Synedra affinis*, Kütz. San Pedro, not rare. [M.]

175. *Synedra affinis*, var. *parva*, Kütz. San Pedro, somewhat rare. [M.]

176. *Synedra grandis*, Mer. Monterey, common. [M.]

See my paper on the Diatoms of the Sea of Azof.

177. *Synedra investiens*, W. Sm. Santa Monica, on *Macrocyctis*, very common. [M.]

178. *Synedra kamschatica*, Grun. Monterey, common. [M.]

179. *Synedra minuta*, Mer. San Pedro, not rare. [M.]

See my paper on the Diatoms of the Black Sea, parts i. & ii.

180. *Synedra nitzschioides*, Grun. San Pedro, not common.
[M.]

A small form 0.053–0.056 mm. in length. Girdle-face quite straight. Endochrome granular.

181. *Synedra undulata* (Bail.), Greg. San Pedro, somewhat rare. [M.]

182. *Asterionella formosa*, Harr. (var.?). Northern California. [M.]

183. *Chætoceros californicus*, Grun. (fossil?). From Wolle, Diat. Amer. pl. lxx. fig. B.

184. *Chætoceros diadema* (Ehr.), Grun. San Pedro; Northern California. [M.]

185. *Chætoceros incurvus*, var. *angusta*, Mer. (Pl. V. fig. 23.) San Pedro, very rare. [M.]

Amongst the many endocysts of *Ch. incurvus* which I

have observed* I have never seen such narrow elongated valves as represented in fig. 23. It seems therefore advisable to distinguish it as a separate variety. The puncta of the valve are also much larger, and there is a punctum to be seen at the bifurcation of the awns which does not exist in the type species. General length 0·031 mm., length of the body 0·018 mm., breadth 0·007 mm.

186. *Chætoceros lyra*, Mer. Northern California, very rare. [M.]

See my paper "On Polynesian Diatoms," chapter iv.

187. *Rhizosolenia setigera*, Brightw. San Pedro, rare. [M.]

Bristles very long, straight or arcuate, with a small bright punctum at the summit of the calyptra, or without it. Length of the frustule (without the bristles) 0·1 mm.

188. *Rhizosolenia Stolterfothii*, Per. San Pedro, rare. [M.]

189. *Rhizosolenia styliformis*, Brightw. San Pedro, rare. [M.]

190. *Skeletonema costatum* (Grev.), Cl. San Pedro, not rare. [M.]

191. *Stephanopyxis ferox*, Grev. San Pedro, rare; Calif. guano. [Gv., M.]

192. *Stephanopyxis turgida*, Grev. Calif. guano. [Gv.]

193. *Anaulus birostratus*, Grun. [V. II.]

194. *Biddulphia* (*Triceratium*) *alternans*, var. *tenuipunctata*, Mer. Northern California, very rare. [M.]

See my paper "On Polynesian Diatoms," chapter iv.

195. *Biddulphia* (*Triceratium*) *antediluviana* (Ehr.), V. II. San Pedro, very rare. [M.]

I have seen only one specimen, which was almost identical with the figure of Brightwell representing *Amphitetras tessellata* †, and could therefore be determined as well as *B. tessellata*. I fail, however, to see any difference between this latter species and *B. antediluviana*, except in the alveoli of the first species being less coarse (which is also the case in the specimen from San Pedro) and the margins of the valve less concave than in the second one, although in this regard *B. antediluviana*

* I have given a figure of *Ch. incurvus* in my paper "Note on Diatoms from Chincha Guano," in Ann. & Mag. Nat. Hist., November 1900.

† 'Diatomeentafeln zusammengestellt für einige Freunde,' pl. iii. fig. 11.

varies greatly. If the lesser coarseness should prove to be a constant character, then, of course, a separate variety—var. *tessellata*—could be established, as the true *B. antediluviana* of Europe has invariably very coarse alveoli; but having seen only one individual of that kind, I regard this case as an accidental one. Therefore the best would be, in my opinion, to unite *B. tessellata* and *B. antediluviana* in one species.

196. *Biddulphia* (*Triceratium*) *arctica*, Brightw. Northern California; Monterey, not rare. [G., M.]
197. *Biddulphia* (*Triceratium*) *arctica*, var. *tetragona*, Grun. Northern California, common; Monterey, rather rare. [G.]
198. *Biddulphia* (*Triceratium*) *montereyi*, Brightw.* San Pedro, rare; Northern California. [G., M.]
199. *Biddulphia* (*Triceratium*) *sanpedroana*, Mer., sp. n. (Pl. IV. fig. 27.) San Pedro, not rare. [M.]

Differs from *B. (Amphitetras) punctata*, Grev.†, which is found in Ceylon, by the puncta or alveoli being more rounded and not so closely disposed, the margins of the valve not so deeply concave, and the processes less elongated, broader, and more rounded. There seems to be a difference also in the central part of the valve, which in *B. punctata* shows a well-defined central area with a few scattered granules.

The puncta are sometimes a little larger than represented in my figure, sometimes they are smaller and more distant, but the valve has always about the same shape, its processes never being so prominent and acute as in the type species. The central part of the valve is concave and the concavity has sometimes a quadrangular form with angles opposite to the middle part of the concave margins; if in such individuals the puncta are at the same time very small, they greatly resemble *B. elegans*, Grev. *B. (Triceratium) sanpedroana* is no doubt nearly allied to *B. (Triceratium) antediluviana*.

Number of puncta usually 3·5 in 0·01 mm. (from 3 to 4), greatest diameter (along a diagonal) 0·063–0·119 mm., smallest diameter 0·049–0·091 mm.

This diatom is widely distributed all over the Pacific Ocean. I have found it also in the fossil deposit of Redondo (California).

200. *Biddulphia* (*Triceratium*) *uncinnata*, Grun. (See Wolle, Diat. Amer. pl. cii. fig. 12.)

* *Loc. cit.* pl. i. fig. 18.

† *Loc. cit.* pl. xliii. fig. 8.

201. *Biddulphia aurita* (Lyngb.), Bréb. San Pedro, rare ; Monterey, common. [M.]

202. *Biddulphia Baileyi*, W. Sm. San Pedro, raro. [M.]

203. *Biddulphia Edwardsii*, Febiger. Northern California, common. [G., M.]

Usually with 2-4 very robust spines.

204. *Biddulphia lævis*, var. *minor*. San Pedro, common ; Northern California, rare. [M.]

Diameter attaining 0.112 mm.

205. *Biddulphia longicrucis*, Grev. (Diatomeentaf. zus. f. e. Fr. pl. xxii. fig. 10). Calif. guano. [Gv.]

206. *Biddulphia pulchella*, Gray. San Pedro, very common. [M.]

207. *Biddulphia reticulata*, Roper. San Pedro, somewhat rare. [M.]

208. *Biddulphia reticulata*, var. *rhombica*, Mer. Northern California, very rare. [M.]

209. *Biddulphia Roperiana*, Grev. San Pedro, not very rare ; Calif. guano. [Gv., M.]

210. *Biddulphia simplex*, Mer., sp. n. (Pl. IV. figs. 28-30.) San Pedro, rare. [M.]

Valve delicate, membranaceous, elliptic-lanceolate, with ends acute, without spines or any visible structure. Girdle-face with lateral margins straight (fig. 29) or with valves being separated by only a very slight concavity (fig. 30, *a, a*) from the connecting membrane ; processes short, acute, middle part of the valve slightly convex, showing two concave arcuate lines uniting in the centre. Length of the valve 0.042 mm., breadth 0.018 mm.

211. *Biddulphia tumida*, Roper. (Diatomeent. zusamm. f. e. Fr. pl. xxvi. figs. 18, 19). Calif. guano. [Gv.]

212. *Biddulphia Tuomeyi*, Bail. Calif. guano ; San Pedro, rare. [Gv., M.]

In San Pedro I have seen a narrow valve 0.187 mm. in length and 0.042 mm. in breadth, probably belonging to a variety of this species.

213. *Biddulphia* (*Cerataulus*) *turgida*, W. Sm. San Pedro, rare. [M.]

214. *Porpeia quadrata*, Grev. (Diatomeentaf. zus. f. e. Fr. pl. lxxvii. fig. 20). San Pedro, very rare. [M.]

215. *Isthmia nervosa*, Kütz. Monterey, Santa Barbara, very common; San Pedro, very rare. [M.]
216. *Melosira Borreri*, Grev. San Pedro, very common. [M.]
217. *Melosira Jurgensii*, Ag. San Pedro, rare. [M.]
218. *Melosira nummuloides* (Bory), Ag. San Pedro, rare. [M.]
219. *Melosira sol*, Kütz. (*Cyclotella radiata*, Br. Diatomeent. zus. f. ein. Fr. pl. xxix. fig. 11.) San Pedro, common; Monterey, somewhat rare. [M.]
220. *Podosira Febigerii*, Grun. (Arct. Diat. p. 119). [G.]
221. *Podosira fusca*, Mer. San Pedro, rather rare. [M.]
See my paper on the Diatoms of the Black Sea.
222. *Podosira maxima*, var. *californica*, Grun. (Arct. Diat. p. 118). [G.]
223. *Hyalodiscus subtilis*, Bail. Northern California, very common; San Pedro, not rare. [G, M.]
224. *Hyalodiscus subtilis*, var. *scotica* (Kütz.), Grun. San Pedro, not very rare. [M.]
225. *Eupodiscus californicus*, Grun. (V. Heurek, Synops. pl. cxviii. fig. 8). Gulf of California. [V. H.]
226. *Aulacodiscus circumdatus*, A. S. (A. S., Atlas, pl. xxxv. fig. 5; Wolle, Am. Diat. pl. lviii. fig. 7). [A. S.]
227. *Aulacodiscus Kittonii*, Arn. San Pedro, very common. [M.]
228. *Aulacodiscus oregonus*, Grev. San Pedro and Northern California, common. [V. H., M.]
229. *Aulacodiscus orientalis*, Grev. San Pedro and Northern California, very rare and somewhat doubtful. [M.]
230. *Auliscus sculptus*, var. *cœlata*, Bail. San Pedro, not rare; Northern California. [M.]
231. *Auliscus sculptus*, var. *punctulata*, Mer. Northern California, not very rare. [M.]
See my paper "On Polynesian Diatoms," chapter iv.
232. *Actinoptychus heliopelta*, Grun. San Pedro, rare. [M.]
233. *Actinoptychus splendens* (Schadb.), Ralfs. San Pedro, not very rare. [M.]
234. *Actinoptychus undulatus*, Ehr. San Pedro, not rare. [M.]

235. *Asteromphalus elegans*, Grev. (Diatomeentaf. pl. xxi. fig. 6). Calif. guano. [Gv.]
236. *Asteromphalus flabellatus*, Grev. (Diatomeentaf. pl. xxi. figs. 4, 5). Calif. guano. [Gv.]
237. *Asteromphalus heptactis* (Bréb.), Ralfs (*Spatangidium Ralfsianum*). Calif. guano. [Gv.]
238. *Arachnoidiscus Ehrenbergii*, Bail. San Pedro, rather rare; Northern California, common. [M.]
239. *Arachnoidiscus ornatus*, Ehr. San Pedro, rather common. [M.]
240. *Stictodiscus californicus*, Grev. Calif. guano; San Pedro, not rare. [Gv., M.]
241. *Actinocyclus Ehrenbergii*, Ralfs. San Pedro, rare. [M.]
242. *Actinocyclus subtilis* (Greg.), Ralfs. Monterey, common. [M.]
243. *Coscinodiscus curvatulus*, Grun. Northern California, not very rare. [M.]
244. *Coscinodiscus excentricus*, Ehr. Northern Pacific, rather rare. [A. S., M.]
245. *Coscinodiscus gigas*, Ehr. San Pedro, rare; Northern California, very common. [M.]
246. *Coscinodiscus lineatus*, var. *leptopus*, Grun. San Pedro, rare; Northern California, rather rare. [M.]
247. *Coscinodiscus nitidus*, Greg. San Pedro, rare. [M.]
248. *Coscinodiscus nitidus*, var. *radiata*, Mer. San Pedro, rare. [M.]
249. *Coscinodiscus radiatus*, Ehr. San Pedro, very common; Northern California, not rare. [M.]
250. *Coscinodiscus radiatus*, var. *centralis* (Ehr.), Rattr. San Pedro, rare. [M.]
251. *Coscinodiscus radiatus*, var. *concinna*, W. Sm. Northern California, rather rare. [M.]
252. *Coscinodiscus radiatus*, var. *oculus iridis*, Ehr. San Pedro, rare; Northern California, not rare. [M.]
253. *Coscinodiscus subtilis* (Ehr.?), Grun. San Pedro, not rare; Northern California, rather common. [M.]

EXPLANATION OF THE PLATES.

PLATE IV.

- Fig. 1. *Nitzschiella tenuirostris*, Mer. (typica). San Pedro. $\frac{600}{1}$.
- Fig. 2. Ditto. *a*, valve; *b*, girdle-face. San Pedro. $\frac{600}{1}$.
- Fig. 3. Ditto. San Pedro. $\frac{600}{1}$.
- Figs. 4, 5. *N. tenuirostris*, forma *directa*. San Pedro. $\frac{600}{1}$.
- Fig. 6. *N. tenuirostris*, var. *hamulifera*, Mer. Mediterranean (Villefranche). $\frac{600}{1}$.
- Fig. 7. Ditto. Diagram showing the spiral torsion of the ends.
- Fig. 8. *N. tenuirostris*, var. *parva*, Mer. Valve. Black Sea (Theodosia, Crimea). $\frac{600}{1}$.
- Fig. 9. Ditto. Girdle-face of the same individual.
- Fig. 10. Ditto. San Pedro. $\frac{600}{1}$.
- Fig. 11. *N. tenuirostris*, forma *minutissima*. San Pedro. $\frac{600}{1}$.
- Fig. 12. *Nitzschiella gracilis*, Mer. (typica). Valve. San Pedro. $\frac{600}{1}$.
- Fig. 13. Ditto. Girdle-face of the same individual.
- Fig. 14. *N. gracilis*, var. *reversa*, Mer. San Pedro. $\frac{600}{1}$.
- Figs. 15-17. *Nitzschiella biplacata*, var. *pacifica*, Mer. Figs. 15 & 17, valves; fig. 16, girdle-face. San Pedro. $\frac{600}{1}$.
- Figs. 18-20. *Nitzschiella californica*, Mer. Fig. 18, valve; figs. 19 & 20, girdle-faces. Redondo, California. $\frac{600}{1}$.
- Fig. 21. *Cylindrotheca gracilis* (Bréb.), Grun. San Pedro. $\frac{600}{1}$.
- Figs. 22, 23. *Mastogloia (Orthonoia) Wrightii*, O'Meara. Northern California. $\frac{900}{1}$.
- Fig. 24. Optical section through a frustule of *Navicula forcipata*, Grev. $\frac{900}{1}$.
- Fig. 25. *Navicula (Rhoiconoia) genuiflexa*, Kütz., with cell-contents. San Pedro.
- Fig. 26. *Diploneis papula*, A. S., with cell-contents. San Pedro.
- Fig. 27. *Biddulphia (Triceratium) sanpedroana*, Mer. San Pedro. $\frac{600}{1}$.
- Figs. 28-30. *Biddulphia simplex*, Mer. San Pedro. Figs. 28 & 29 $\frac{600}{1}$.

PLATE V.

- Figs. 1-3. *Licmophora lata*, Mer. San Pedro. $\frac{600}{1}$.
- Figs. 4, 5. *Licmophora pacifica*, Mer. In fig. 4 the striae are not represented. San Pedro. $\frac{600}{1}$.
- Fig. 6. *Licmophora montereyana*, Mer. Monterey. $\frac{600}{1}$.
- Fig. 7. *Licmophora Thumii*, Mer. Monterey. $\frac{600}{1}$.
- Figs. 8, 9. *Licmophora Monksii*, Mer. San Pedro. $\frac{900}{1}$.

- Figs. 10, 11. Licmophora dubia*, var. *lutior*, Mer. Santa Catalina Island. $\frac{600}{1}$.
- Figs. 12-14. Licmophora flabellata*, var. *parva*, Mer. *Figs. 12 & 13*, San Pedro; *fig. 14*, Monterey. $\frac{600}{1}$.
- Figs. 15, 16. Grammatophora costata*, Mer. Monterey. $\frac{600}{1}$.
- Fig. 17. Fragilaria spicula*, Mer., fixed on a *Nitzschia*. Santa Monico. $\frac{900}{1}$.
- Figs. 18-20. Nitzschia spiralis*, Mer.; the same frustule in three different positions. San Pedro. $\frac{600}{1}$.
- Fig. 21. Rhabdonema*, sp. Northern California. $\frac{600}{1}$.
- Fig. 22. Ditto.* Part of a valve at $\frac{900}{1}$.
- Fig. 23. Chatoceros incurvus*, var. *angusta*, Mer. San Pedro. $\frac{600}{1}$.
- Figs. 24-27. Eunotogramma*, sp. San Pedro. $\frac{900}{1}$.

LXVI.—*Two new Genera of Coleoptera belonging to the Cupesidæ and Prionidæ.* By CHAS. O. WATERHOUSE, F.E.S.

THE British Museum has lately received a small collection of Coleoptera from Rio Janeiro. It contained two remarkable genera, which I have no hesitation in describing as new. One belongs to the Cupesidæ, but differs from all known species in the form of the head and in having smooth antennæ; the other to the aberrant Prionidæ, and is allied to *Mysteria*.

Cupesidæ.

TETRAPHALERUS, gen. nov.

General form and characters of *Cupes*. Head elongate, narrowed anteriorly. Eyes somewhat prominent. Antennæ smooth and shining, nearly as long as the head and thorax taken together, widely separated, placed in a deep impression near the base of the mandible, the impression continued posteriorly beneath the head close to the eye and forming a deep channel, so that the antenna can lie in it when at rest. The two grooves are rather wider posteriorly, so that the flat under surface of the head between them is narrower behind than in front. The mentum is small, concave, longer than broad, obliquely narrowed in front, rectilinear at the sides. [The palpi are wanting.] The maxillary palpi have the apical joint fusiform, rather more narrowed at the base than at the apex. Mandibles very prominent, incurved and enlarged at the apex, where they are bisinuate. Thorax a